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Washington, D.C. 20554**

In the Matter of)	
)	
Preserving the Open Internet)	GN Docket No. 09-191
)	
Broadband Industry Practices)	WC Docket No. 07-52
)	
National Broadband Plan for our Future)	GN Docket No. 09-51

Reply Comments of Dennis L. Weisman and Robert B. Kulick

We are pleased to provide our reply comments in the above-captioned proceedings in the form of the attached study, “Price Discrimination, Two-Sided Markets and Net Neutrality Regulation.” Our comments are especially relevant to paragraphs 60-82 of the Notice of Proposed Rulemaking and to filed comments that address those paragraphs.

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Price Discrimination, Two-Sided Markets and Net Neutrality Regulation

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Abstract

In an October 22, 2009 Notice of Proposed Rulemaking, the Federal Communications Commission posed a number of questions regarding the merits of price discrimination given the two-sided structure of broadband markets. The law and economics literature finds that price discrimination is presumptively welfare-enhancing, that it is frequently a response to competitive market forces rather than the absence of such forces, and that the merits of price discrimination are likely enhanced in a two-sided markets framework. This is the case because the platform provider must use prices to solve the “chicken and egg” problem—both sides of the market must be brought on board under conditions in which the relative valuations placed on the transaction can vary markedly across the two sides of the market. Hence, price discrimination is necessary to unleash the full potential of broadband markets. Another form of conduct of concern to the Commission is access tiering, in which broadband providers market different levels of service quality to content providers. Access tiering is an example of differential pricing rather than discriminatory pricing. Prohibitions on such practices would likely serve to reduce consumer welfare, suppress competition, and discourage investment in network infrastructure.

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1. Introduction

On October 22, 2009, the Federal Communications Commission (the “Commission”) released a Notice of Proposed Rulemaking (“NPRM”) that set forth a proposed “Net Neutrality” regulation in the form of an Internet “nondiscrimination” rule.³ The primary objective of this white paper is to examine the potential economic and public policy consequences of the Commission’s proposed nondiscrimination rule in the context of two economic concepts that the Commission specifically references in the NPRM: “price discrimination” and “two-sided markets.”⁴ We conclude that:

(1) Price discrimination, where a firm charges different prices for the same service, is economically distinct from differential pricing, where a firm charges a menu of prices for varying degrees of service. Indeed, from an economic perspective, it is not appropriate to analyze differential pricing as a form of discrimination.

(2) The Commission’s proposed nondiscrimination rule would seem to prohibit three distinct forms of economic conduct that should be evaluated separately. First it would prohibit Internet service providers (“ISPs”) from charging different prices to content providers for the provision of different levels of service (“differential pricing”). Second, it would prohibit ISPs from charging different prices for the same service (“price discrimination”). Third, it would prevent ISPs that vertically integrate into the provision of Internet content from offering superior terms of service to affiliated content providers than to nonaffiliated content providers.

(3) By increasing the variety of services offered by firms, differential pricing generally increases consumer welfare and encourages innovation. Proscribing ISPs’ ability to offer content

3. Federal Communications Commission, Notice of Proposed Rulemaking, In the Matter of Preserving the Open Internet/Broadband Industry Practices, GN Docket No. 09-191/WC Docket No. 07-52, Oct. 22, 2009 [hereinafter *NPRM*].

4. *Id.* ¶¶ 64-66.

providers a menu of service and pricing options would reduce social welfare both in the short-run and in the long-run.

(4) Price discrimination is a common feature in competitive markets and economists have demonstrated that it often increases economic efficiency. Although price discrimination reduces static efficiency under some circumstances, it is particularly likely to increase static efficiency in the market for broadband services because the market is two-sided and is becoming increasingly competitive. Furthermore, because price discrimination encourages innovation in the provision of broadband services, price discrimination by ISPs promotes dynamic efficiency.

(5) Vertical integration by ISPs into the content space theoretically could raise some potential welfare concerns. This observation notwithstanding, vertical integration is often welfare enhancing and antitrust litigation already provides recourse in those instances when vertical integration is anticompetitive. Should vertical integration by ISPs become problematic, an *ex post* regulatory response focused on evaluating specific instances of anticompetitive conduct would be superior to a blanket *ex ante* regulation that preempts a wide range of potentially welfare enhancing conduct.

(6) Although the Commission has not proposed a blanket “zero-price” regulation that would prohibit ISPs from charging a positive price to content providers for Internet access, some proponents of Net Neutrality regulation have proposed this broader form of price regulation. Because a blanket zero-price regulation would also proscribe differential pricing and price discrimination by ISPs, such a policy would likely reduce economic welfare. Furthermore, the economics of two-sided markets are such that prohibiting ISPs from charging a positive price to content providers would likely precipitate negative consequences even beyond those that would be created by the Commission’s proposed nondiscrimination rule.

The remainder of this paper is organized as follows. Price discrimination is formally defined and its implications for economic welfare are explored in Section 2. Section 3 examines the nature of two-sided markets and the unique challenges it poses for competition policy. Section 4 examines the welfare consequences of the Commission’s proposed nondiscrimination rule and an alternative policy of “zero-price” regulation in terms of the economic approach developed in the prior sections. Finally, in Section 5, we provide a summary of our main findings and a brief discussion of the associated public policy implications.

2. A Primer on Price Discrimination

2.1 What is Price Discrimination?

As typically employed in the economics literature, the terms “discriminatory pricing” or “price discrimination” refer to price differences that cannot be explained by differences in production costs.⁵ In other words, the term price discrimination describes situations where a firm charges different prices to its customers for the same service. Price discrimination is economically distinct from circumstances where a firm charges its customers a different price for varying degrees of service (“differential pricing”). In the context of the relationship between ISPs and content providers, differential pricing would involve allowing ISPs to charge all content providers uniform price premiums for enhanced quality of service (“QOS”), such as prioritized access to subscribers. Price discrimination, on the other hand, would involve ISPs charging a different price to different content providers for the same level of service.

5. Price discrimination can also be more broadly defined as “the sale of two or more similar goods at prices which are in different ratios to marginal cost.” See GEORGE J. STIGLER, *THE THEORY OF PRICE* 209 (Macmillan Publishing 1966). This definition, however, introduces the non-rigorous notion of “similarity” into the definition of the concept. Although this qualification is necessary in some instances, we use the term price discrimination in the sense that Hal Varian used the term in his seminal work on price discrimination. See Hal Varian, *Price Discrimination and Social Welfare*, 75 *AMER. ECON. REV.* 870, 870-875 (1985). We use his definition because it is the most instructive for dissecting the potential welfare consequences of the Commission’s proposed nondiscrimination rule.

Differential pricing is not usefully analyzed as a form of economic discrimination. Prohibiting differential pricing on an *ex ante* basis would prevent firms from offering an array of products and services for which price-quality combinations vary in response to the heterogeneous nature of consumer tastes and preferences. Consequently, regulation prohibiting differential pricing creates “discrimination” by restricting the choices available to firms and consumers who would willingly pay higher prices for enhanced service. Indeed, differential pricing is better analyzed in terms of a dichotomy between promoting equality of opportunity and promoting equality of outcome. It is a long-standing economic principle that a policy of promoting equality of opportunity enhances social welfare.⁶ In Section 4, we show that the restrictions barring content providers and ISPs from opportunities to enter into mutually beneficial QOS agreements would likely reduce economic welfare.

On the other hand, price discrimination involves firms treating customers differently because of differences in their demand characteristics. While the term “discrimination” carries a negative connotation, price discrimination is often welfare enhancing. Indeed, “Ramsey pricing,” which is the economic prescription for setting socially optimal prices in declining cost industries (such as telecommunications), involves the explicit use of price discrimination.⁷

2.2 Price Discrimination and Market Power

There was a time when economists thought that price discrimination was only feasible in markets with a monopolistic structure. More modern economic analysis, however, recognizes that price discrimination is common in markets that are effectively competitive. In fact,

6. Alfred E. Kahn, *The Uneasy Marriage of Regulation and Competition*, 5 *TELEMATICS* 1, 9 (1984).

7. Specifically, when first-best prices (prices set equal to marginal) would not permit a regulated firm to remain financially viable, Ramsey pricing or second-best pricing specifies that prices deviate from marginal cost proportionately more (less) in those markets characterized by relatively inelastic (elastic) demand while enabling the firm to generate revenues sufficient to cover its costs. *See, e.g.*, Ronald R. Braeutigam, *Optimal Policies for Natural Monopolies in* 1 *HANDBOOK OF INDUSTRIAL ORGANIZATION* 1320-1327 (Richard Schmalensee & Robert Willig, eds., 1989).

differential pricing and price discrimination are probably more common than uniform pricing in the overall economy and are integral to the competitive process itself. The discovery that price discrimination is consistent with, and even an indicator of, vigorous competition is significant because economists recognize that competition forces firms to set prices that increase long-term economic welfare. Drawing on this principle, economists have demonstrated formally that price discrimination can be welfare-enhancing when it leads to an increase in total output in the market relative to a uniform price.⁸

Examples of price discrimination abound. Grocery stores target coupons to selected consumers and run daily and weekly specials for a variety of products and services. Catalog sellers are known to vary prices by zip codes and buyers' socio-economic characteristics. Carbonated soda and water bottlers are experimenting with so-called "smart vending" machine technology to vary prices according to environmental conditions. Book retailers like Amazon and Barnes & Noble monitor keyboard click streams on Internet purchases to assemble bundles, packages and special pricing offers tailored to consumers' specific tastes and preferences. Package liquor stores frequently offer discounts on Mondays and Tuesdays to stimulate demand on what would otherwise be relatively slow business days.⁹ There is now general recognition in the economics literature that not only are such practices consistent with competitive market behavior, but that competitive markets will actually force firms to adopt discriminatory rate

8. See, e.g., JEAN TIROLE, *INDUSTRIAL ORGANIZATION* 137-140 (MIT Press 1988); Varian, *supra*, at 870-875; Antitrust Modernization Commission, *Report and Recommendations*, Section 3 at 318 (1997) ("The economic reality is that price differences and price discrimination typically benefit, not harm, consumers."). The general policy advisability of allowing price discrimination in retail markets does not carry over in full to wholesale or input markets, particularly when the input is monopoly provisioned. See, e.g., Michael Katz, *The Welfare Effects of Third-Degree Price Discrimination in Intermediate Good Markets*, 77 AMER. ECON. REV. 154, 154-167 (1987); Patrick Degraha, *Input Market Price Discrimination and the Choice of Technology*, 80 AMER. ECON. REV. 1246, 1246-1253 (1990).

9. See, e.g., CARL L. SHAPIRO & HAL R. VARIAN, *INFORMATION RULES: A STRATEGIC GUIDE TO THE NETWORK ECONOMY*, Chapters 2 and 3, (Harvard Business School Press 1998).

structures for their own survival.¹⁰ Indeed, commercial airlines are known to operate some of the most sophisticated price discrimination (aka “yield management”) programs in the economy and yet still face a perpetual struggle to remain financially viable.¹¹

2.3 Key Policy Lessons

There are three key policy lessons to be gleaned from this discussion. First, price discrimination is not synonymous with differential pricing. Price differences that merely reflect cost differences due to offering various grades of service quality do not constitute price discrimination. Second, price discrimination is often welfare-enhancing, and instances of welfare-reducing price discrimination should be identified on a case by case basis. A general prohibition against price discrimination is overly restrictive and likely to be welfare-diminishing in its effect. Finally, in contrast to earlier economic thinking that price discrimination was reflective of the exercise of monopoly power, more recent research has demonstrated that market forces will generally force competitive firms, especially in declining cost industries, to adopt price discrimination for purposes of financial viability. As we discuss in depth in Section 4, this last observation is particularly important for evaluating the likely economic consequences of the nondiscrimination rule proposed by the Commission as there is no credible evidence that the major telecommunications firms are earning monopoly profits.¹²

10. See, e.g., William J. Baumol, *Regulation Misled by Misread Theory: Perfect Competition and Competition-Imposed Price Discrimination*, AEI-Brookings Joint Center (2005). A central thesis of Professor Baumol’s analysis is that it is often the very presence of effective competition that forces differential prices upon the firm.

11. Michael E. Levine, *Price Discrimination Without Market Power*, YALE J. ON REG. 1, 1-36 (2002). (“But most commonly, real-world goods and services are produced under conditions where costs (sunk or not) like R&D, advertising or production or distribution costs like common facilities, are shared with other products. Under these common conditions, firms constrained by competition from earning monopoly rents will adopt price discrimination as the optimum strategy to allocate common costs among buyers. Not only is this frequently welfare enhancing (as Ramsey pricing suggests it is for certain monopolists), it is not evidence of the unilateral or collusive power to affect industry output, which is at the heart of the ‘monopoly power’ or ‘market power’ concepts.”).

12. For example, a recent paper finds that none of the three RBOCs, AT&T, Verizon or Qwest, have q-ratios (i.e., the quotient of market-to-book values) that exceed unity. See Thomas W. Hazlett & Dennis L. Weisman, *Market Power in U.S. Broadband Services*, George Mason University Law and Economics Research Paper Series, 09-69, November 2009.

3. What is a Two-Sided Market?

In the NPRM, the Commission specifically observed that the economics of “two-sided” markets may be important in evaluating the welfare consequences of the proposed nondiscrimination rule.¹³ Before delving into this particular question in Section 4, we first develop the requisite foundation for that analysis by providing an introduction to the economics of two-sided markets.

3.1 Definition of the Economic Concept of Two-Sided Markets

Informally, a two-sided market can be thought of as a meeting place that brings together two distinct user groups, each of which benefits from the presence of the other. Examples include auctions, credit cards, dating bars, newspapers, video game consoles and the Yellow Pages.¹⁴ No car auction would be possible without the presence of buyers willing to purchase and sellers willing to sell vehicles. Thus, auctioneers must set their commissions to make sure there are a sufficient numbers of buyers and sellers at a given auction. In the case of (heterosexual) dating bars, bar owners must attract both men and women and often set different prices for men and women to attract each gender in the desired proportions. Newspapers derive their revenues from both subscribers and advertisers. Thus, the prices that newspapers set for subscribers and the prices they set for advertising space must be calibrated due to the fact that advertisers’ willingness to pay will be determined by subscribership.

Each of these examples demonstrates a common feature of two-sided markets, that of the “chicken and egg” problem: the platform provider (the newspaper, bar owner, or auctioneer) must facilitate the participation of customers on each side of the market, and customers’ demand for the network created by the platform on one side of the market depends on the level of participation by the platform’s customers on the other side of the market. Consequently, the

13. *NPRM*, *supra*, ¶ 66.

14. Marc Rysman, *The Economics of Two-Sided Markets*, 25 J. ECON. PERSPECT. 124, 124-143 (2009).

objective of the platform provider is to set prices so as to bring both sets of customers together, as two-sided participation is the *sine qua non* for the two-sided market to function.

Consider the following two definitions of two-sided markets:

Broadly speaking, a two-sided market is one in which 1) two sets of agents interact through an intermediary or platform, and 2) the decisions of each set of agents affects the outcomes of the other set of agents, typically through an externality.¹⁵

Two-sided markets involve two distinct types of users, each of whom obtains value from interacting with users of the opposite type over a common platform. In these markets, platforms cater to both types of users in a way that allows them to influence the extent to which cross-user externalities are internalized.¹⁶

It is instructive to identify the common themes in these definitions. First, the platform serves as the intermediary in which prices are used as instruments to bring both sides of the market together. Second, each side of the market imposes externalities on the other side of the market, and it is not possible to negotiate away these externalities. Third, the price charged on one side of the market may create a positive or negative externality depending on its effect on the total value of the network.¹⁷ To see how the structure of prices charged across each side of the market can create network externalities consider the following example: women may derive less utility from the presence of an additional man at a singles bar than men derive from the presence of an additional woman. The total utility that both men and women derive from the network created by the bar depends for men on the presence of women and for women on the presence of men. Consequently, it may be optimal for the dating bar to set lower prices for women (possibly even subsidize women) in order to induce them to patronize the dating bar in sufficient numbers.

15. Rysman, *supra*, at 125.

16. Julian Wright, *One-Sided Logic in Two-Sided Markets*, 3 REV. NET. ECON. 42, 44 (2004).

17. Moreover, high price-cost margins on one side of a two-sided market are not dispositive of market power. *See id.* at 47.

Symmetrically, men may be required to pay a tax in patronizing the dating bar so as to maximize the value of the dating bar as a network.¹⁸ As professor Wright observes:

Where men and women place a different value on matching with each other, a club that sets a symmetric fee structure will generally not attract as many users, and it will not make as much profit, as a club that sets a differential fee structure. Competition will drive clubs to offer women cheaper entry fees, or other discounts, to attract the optimal balance of men and women at the club. The competitive structure of fees will generally not reflect costs.¹⁹

Professors Jean-Charles Rochet and Jean Tirole emphasize the importance of the distinction between price level and price structure in two-sided markets.²⁰ Let the price level for the transaction be given by $p = p^B + p^S$, where p^B is the transaction price to the buyer and p^S is the transaction price to the seller. The price structure is the particular allocation of p between p^B and p^S . The market for transactions between the two sides is one-sided if the volume of transactions (V) realized on the platform depends only on the aggregate access price level p . That is to say, it is not sensitive to changes in the price structure, or reallocations of the total price between the buyer and the seller. Conversely, if the volume of transactions varies with p^B while p is kept constant, the market is said to be two-sided. In formal terms, whether a market is one-sided or two-sided can be expressed mathematically as follows:

$$(1) \left. \frac{\partial V}{\partial p^B} \right|_{dp=0} \begin{cases} = 0 \Rightarrow \text{one-sided} \\ \neq 0 \Rightarrow \text{two-sided} \end{cases}$$

It necessarily follows from this definition that in two-sided markets the price charged to one side of the market does not only affect the utility of those participating in the transaction, but

18. This is precisely the prescription of Pigouvian tax principles. To wit, efficiency requires that goods and services that confer positive (negative) externalities be subsidized (taxed). This follows from the fact that for goods and services that impose negative (positive) externalities, the social marginal cost is greater (less) than the private marginal cost. Note further that since the marginal social cost for men (inclusive of negative externalities) exceeds the social marginal cost for women (inclusive of positive externalities), the respective price to social marginal cost ratios are not necessarily unequal despite the fact that men pay higher prices than women. In other words, differences in prices across the two sides of the market are not dispositive of price discrimination under these conditions.

19. Wright, *supra*, at 47.

20. Jean-Charles Rochet & Jean Tirole, *Two-Sided Markets: A Progress Report*, 37 RAND J. ECON. 645, 648 (2006).

rather the total utility that participants derive from the market depends on the overall structure of prices. In other words, because each transaction on the network creates value for network participants who are not part of the transaction and because users on one side of the market may be more sensitive to prices than users on the other side of the market, the value of the network depends on both the total price level and how the total price is allocated between the two sides of the market.

3.2 Optimal Pricing in a Two-Sided Market

In conceptual terms, it is useful to conceive of optimal pricing in two-sided markets as the Ramsey or inverse-elasticity rule times two. That is to say, the inverse-elasticity rule is applied once to determine the optimum price level (p) and a second time to determine the optimum price structure—the allocation of p between p^B and p^S . Let $n^B(p^B, p^S)$ and $n^S(p^B, p^S)$ denote the number of buyers and sellers, respectively, and let c denote the marginal cost of the transaction. The platform's profit is given by

$$(2) \pi = (p^B + p^S - c)n^B(p^B, p^S) n^S(p^B, p^S).$$

Following Rochet and Tirole, for a given total price ($p = p^B + p^S$), the optimal price structure is obtained by maximizing the volume of usage, or

$$3) V(p) = \max \{n^B(p^B, p^S) n^S(p^B, p^S) \text{ under the constraint that } p^B + p^S = p\}.$$

The price level is determined by the standard formula, often called the “Lerner Index,” or

$$(4) \frac{p-c}{p} = \frac{1}{\eta},$$

where η is the elasticity of volume with respect to total price: $\eta = -\frac{pV'(p)}{V(p)}$. When there are no fixed costs and benefits (i.e., there is only usage value and usage costs), the optimum price structure satisfies

$$(5) \frac{p^B - (c - p^S)}{p^B} = \frac{1}{\eta^B} \text{ and } \frac{p^S - (c - p^B)}{p^S} = \frac{1}{\eta^S},$$

where η^B and η^S are the price elasticities of demand on side B and side S , respectively. To understand the intuition for (5), recognize that when there is a loss of a transaction on side i due to an increase in the per-transaction price p^i , there is an “opportunity cost $c - p^j$,” since the platform cost c of the transaction has to be defrayed by the payment p^j levied on the other side.”²¹ Hence, (5) is simply the standard Lerner formula with the per-transaction cost replaced with the opportunity cost.

The two pricing rules in (4) and (5) are amenable to straightforward economic interpretation. The price level rule in (4) simply says that the more elastic (inelastic) is the total level of transactions, the lower (higher) is the price level (p), *ceteris paribus*. The interpretation of the price structure rule in (5) is similar. The more elastic is the buyer side of the market relative to the seller side of the market, the smaller the allocation of the price level burden to p^B and the larger is the allocation of the price level burden to p^S , *ceteris paribus*.²² Intuitively, the side of the market with the greater willingness to participate (i.e., the more inelastic demand) pays the higher price and *vice versa*. The paramount objective of the platform is to design prices that serve to get both sides on board in the proper proportions and this frequently entails offering different prices to the two sides of the market.

3.3 The Seesaw Principle

An important corollary of the price structure rule in (5), and one that may have important implications for pricing issues related to Net Neutrality, is that of the *seesaw principle*. Intuitively, this principle suggests that relative valuations are likely to differ on the two sides of

21. Rochet & Tirole, *supra*, at 655.

22. For a thoughtful discussion of the price structure result that seeks to clarify a great deal of confusion in the literature, see Malte Krueger, *The Elasticity Rule for Two-Sided Markets: A Note*, 8 REV. NET. ECON. 271, 271-278 (2009).

the market, and placing downward pressure on price on one side of the market therefore tends to place upward pressure on price on the other side of the market in a manner akin to the behavior of a seesaw.²³ As Professors Rochet and Tirole observe:

The linkage between the two sides comes from the reinterpretation of costs as opportunity costs. The linkage also shows up in the form of a simple “seesaw principle”: a factor that is conducive to a high price on one side, to the extent that it raises the platform’s margin on that side, tends to call for a low price on the other side as attracting members on the other side becomes more profitable.²⁴

To elaborate on underpinnings of the seesaw principle a bit more formally, it is instructive to solve (5) for p^B and p^S , respectively, to obtain

$$(6) \quad p^B = \left[\frac{\eta^B}{\eta^B - 1} \right] (c - p^S) \text{ and } p^S = \left[\frac{\eta^S}{\eta^S - 1} \right] (c - p^B).$$

Observe in (6) that the coefficient on each of the cross-price terms is negative since each of the side-specific elasticities is assumed to be greater than unity. In words, there is an inverse relationship between the respective prices on the two sides of the market—that is, a relatively high price on one side of the market implies a relatively low price on the other side of the market, *ceteris paribus*.²⁵ Moreover, from a policy perspective, to the extent that regulation constrains prices on one side of the market, it would have the effect of forcing prices up on the other side of the market. The implication is that a prohibition on charging content providers—the so-called zero-price mandate—would raise the prices ISPs charged to broadband consumers,

23. Moreover, there is no general principle in two-sided markets that ensures that greater platform competition will necessarily result in more balanced prices between the two sides of the market. See Wright, *supra*, at 57.

24. Rochet & Tirole, *supra*, at 659.

25. Of course, a similar result obtains when the two sides of the market are modeled as two complementary products sold by a multi-product monopolist. If the two sides of the market have constant marginal cost c_i and c_j , $i \neq j$, respectively, the corresponding pricing rule is given by

$$\frac{p_i - c_i}{p_i} = \frac{1}{\varepsilon_{ii}} + \frac{(p_j - c_j)R_j}{p_j R_i} \varepsilon_{ij},$$

where R_i and R_j denote revenues on side i and side j , $\varepsilon_{ii} > 0$ is the own price elasticity of demand for product i and ε_{ij} is the cross elasticity of demand for product i with respect to the price of j , which is negative in the case of complements. Hence, when a factor is conducive to a high price-cost margin for product j , it tends to call for a low price for product i when product i and product j are complements. This, of course, is similar in spirit to the seesaw principle in two-sided markets.

thereby lessening broadband penetration, *ceteris paribus*.²⁶ The higher the price elasticity of broadband access, the more pronounced this effect will be in moving toward universality of broadband subscription.

Examples abound in two-sided markets of very low, even negative, prices on one side of the market and relatively high prices on the other side of the market.²⁷ These include Yellow Pages, free television and various software programs like Adobe Acrobat. In this last example, the Adobe reader is free, but the Adobe writer commands a relatively steep price. Two observations are noteworthy. First, uniform pricing is rare in two-sided markets; it is much more common to observe differential prices across the two sides of the market.²⁸ Second, one side of the market may actually prefer to face a relatively high price to the extent it results in a lower price on the other side of the market and hence a higher level of participation on that side.²⁹

The following intuitive example demonstrates how this is possible. Suppose that there is one buyer and one seller, and they are on opposite sides of the market. The buyer's maximum willingness to pay for the transaction is 9 and the seller's maximum willingness to pay for the transaction is 4. The cost to the platform for facilitating the transaction is 10. If the platform is constrained to uniform pricing, there is no uniform price that enables the platform provider to be

26. For a comprehensive examination of the zero-price mandate in broadband markets, see C. Scott Hemphill, *Network Neutrality and the False Promise of Zero-Price Regulation*, 25 YALE J. ON REG. 135, 135-179 (2008). ("Moreover, consumer usage of broadband service may create significant benefits that are not captured by the access provider or content provider. An access provider strategy to charge content providers, while subsidizing consumers with low financial willingness to pay, could increase adoption and thereby increase these benefits. This attractive strategy is forbidden by a zero-price rule. In sum, neither exclusion nor extraction concerns justify a broad zero-price rule.").

27. Notably, this result can obtain in single-sided markets as well. A case in point is that of a multi-product monopolist in which there is a complementary relationship between two or more products. See Tirole, *supra*, at 70.

28. We use the term differential prices rather than discriminatory prices because the marginal cost of the transaction is a joint cost across the two sides of the market and hence cannot be meaningfully attributed to one side or the other.

29. As Professor Weyl observes, "The average consumer on one side of the market may benefit from being taxed to subsidize consumers on the other side of the market if their average value of interacting with consumers on other side is high enough." E. Glen Weyl, *The Price Theory of Two-Sided Markets* (2009), *forthcoming in* AMER. ECON. REV., available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1324317, at 22.

financially viable and still bring both sides of the market together. This is the case because the maximum (total) price the platform can charge is $8 (= 4 + 4) < 10$, as any price higher than 4 will result in the seller not participating in the transaction. Hence, under the uniform pricing constraint, there is no transaction and economic welfare is equal to zero.³⁰ Now, suppose the constraint on uniform pricing is relaxed and the platform responds by charging the buyer a price of 8 and the seller a price of 3. Total economic welfare is thus equal to the consumer surplus realized by the buyer ($1 = 9 - 8$) plus the producer surplus realized by the seller ($1 = 4 - 3$) plus the producer surplus enjoyed by the platform provider ($1 = 11 - 10$) for a total of 3. Hence, a non-uniform price is not only welfare-enhancing since $3 > 0$, but it renders all three parties, the buyer, the seller and the platform provider better off relative to the case of mandatory uniform pricing.

4. Two-Sided Markets, Price Discrimination and Access Tiering

In the NPRM, the Commission proposed the following “nondiscrimination” rule: “Subject to reasonable network management, a provider of broadband Internet access service must treat lawful content, applications, and services in a nondiscriminatory manner.”³¹ The Commission further explained “[w]e understand the term ‘nondiscriminatory’ to mean that a broadband Internet access service provider may not charge a content, application, or service provider for enhanced or prioritized access to the subscribers of that broadband Internet access service provider.”³² The Commission’s proposed rule would proscribe three distinct economic pricing strategies. First, it would prohibit ISPs from charging differential prices in the form of access tiering. Second, it would prohibit ISPs from engaging in price discrimination. Third, it would

30. The same inefficient result obtains under zero-price regulation. Under a zero-price constraint, the platform provider would have to assess a price of at least 10 on the buyer in order to be viable, but this price exceeds the buyer’s maximum willingness to pay of 9. Hence, there is no transaction and economic welfare is zero.

31. *NPRM*, *supra*, ¶ 105.

32. *Id.*

prohibit ISPs that have vertically integrated into the market for providing Internet content from offering affiliated content providers access to subscribers on preferred terms. In this section of the paper, we use the economic framework developed above to analyze the efficiency implications of *ex ante* regulation of each of these business strategies. We analyze economic efficiency both in the static sense, or how efficient a given market is at a point in time in allocating resources through the price mechanism and in the dynamic sense, or how efficiently the incentives to innovate are structured in a market.

5.1 Access Tiering

By access tiering, we refer to a regime in which content providers and ISPs are allowed to enter into agreements where content providers pay more for superior service. As discussed above, this should be considered a form of differential rather than discriminatory pricing. From an economic perspective, the case for permitting differential pricing in the form of access tiering is strong.³³

First, it is a basic principle of economics that when two parties enter into a voluntary transaction, in the absence of an information failure, the transaction must make both sides better off. From a dynamic efficiency perspective, permitting ISPs to charge differential prices increases social welfare both by providing ISPs with incentives to develop improved networks and by encouraging content providers to use superior QOS to tailor applications to the demands of Internet subscribers. From a static efficiency perspective, in the absence of transaction costs that prevent market participants from negotiating away negative externalities, such mutually beneficial transactions increase social welfare. In the context of the market for the provision of

33. Benjamin E. Hermalin & Michael L. Katz, *The Economics of Product-Line Restrictions With an Application to the Net Neutrality Debate*, 19 INF. ECON. POLICY 215, 215-248 (2007).

Internet content, this means that content providers will purchase superior service from ISPs when it improves their ability to market their services to Internet subscribers.

Although some content providers will inevitably be harmed by the fact that other content providers have become more efficient, this is the hallmark of the competitive process and, as such, economic theory indicates that total economic welfare will likely increase when content providers as a whole are better able to serve Internet subscribers. Conversely, protecting less-efficient content providers by prohibiting access tiering would harm society by impeding more-efficient content providers and limiting the choices available to the Internet subscribers they serve.³⁴ Indeed, this outcome would actually represent a form of truly pernicious discrimination since it would involve an arbitrary transfer of economic wealth to less-efficient content providers to the detriment of society.

As we discussed above, two-sided markets are created by transaction costs that engender structural externalities in the market—scenarios in which the aggregate of mutually beneficial, private transactions will not necessarily maximize total social welfare. The two-sided nature of the Internet actually strengthens the case for access tiering, however, because enhanced QOS offerings will increase subscribers’ internet usage. Increased usage in the context of a two-sided market creates value for subscribers and content providers who do not participate in the actual transaction for enhanced QOS because it expands the scope of the network.

Indeed, the social welfare benefits of fee-for-service contracting have long been recognized as a matter of policy. For instance, in the telecommunications industry, regulated carriers have long been permitted to offer their customers a variety of service options for both long-distance

34. The United States Supreme Court has stated without caveat that “the antitrust laws ... were enacted for the ‘protection of competition, not competitors.’” There is now a better understanding that trade-offs exist between the goals of consumer welfare and protecting small firms. To protect small firms can mean a less efficient economy in which consumers must pay higher prices. *See* Antitrust Modernization Commission, *supra*, at 34 (internal citation omitted).

and local service. Extended area service, local measured service, flat-rate service and flat-rate calling plans are all examples in which regulators have permitted customers to choose between different price-quality combinations for their telecommunications services. In the case of electric power, regulators have permitted special tariffs under which power companies are able to offer large industrial customers lower usage prices for “interruptible” service—service where, in the event that generation capacity cannot meet demand, the industrial customer allows the power company to turn off its service until the capacity problem is resolved.³⁵ Because reliability is simply a particular quality dimension of the service, this arrangement represents a form of access tiering.

Furthermore, in the antitrust sphere, prohibiting a firm from contracting over the most efficient distribution channel is recognized as a form of “raising rivals’ costs” that firms may use anti-competitively to hobble their rivals.³⁶ Because content providers’ demand for superior QOS is derived from subscribers’ demand for higher access speeds, agreements between content providers and ISPs for superior service would only occur under circumstances where it is more efficient for content providers to negotiate enhanced QOS than it is for subscribers. Thus, precluding ISPs and content providers from contracting directly with each other for enhanced QOS would actually institutionalize the very sort of economic harm in the market for broadband services that the antitrust laws are designed to prevent.

5.2 Price Discrimination

As for the second pricing strategy that the nondiscrimination rule may prohibit, price discrimination is particularly likely to increase static efficiency in the context of two-sided markets or markets that are evolving toward a more competitive structure. In two-sided markets

35. In fact, the recent capacity shortages in California would have been even more pronounced if power companies had been precluded from entering into interruptible service arrangements with industrial customers.

36. *United States v. Dentsply Int'l, Inc.*, 399 F.3d 181 (3d Cir. 2005).

price discrimination “allows a platform to capture more of the surplus on the side with discrimination,” which “leads to lower prices on the other side which has now become more valuable.”³⁷ In other words, if an ISP engages in discriminatory pricing by charging different prices to content providers based on their elasticity of demand for Internet access, the ISP will increase the total surplus (economic value) that it extracts from content providers. Because the ISP now extracts more value from content providers, the ISP will reduce prices on the subscriber side of the market to increase surplus on the content side of the market as a corollary of the “seesaw principle” discussed above.³⁸ By creating incentives for an ISP to charge lower prices on the subscriber side of the market, price discrimination on the content side of the market increases the total number of transactions between content providers and subscribers—precisely the conditions under which price discrimination is likely to increase social welfare.³⁹

Furthermore, in markets that are becoming increasingly competitive, price discrimination is likely to be a necessary response to exigencies of thriving in a competitive environment.⁴⁰ Price discrimination is particularly likely to be both necessary and welfare enhancing in evolving markets that are characterized by heavy up-front or fixed costs⁴¹—a condition that unquestionably applies to ISPs who must incur heavy costs to link individual subscribers and content providers to the Internet backbone. Consider, for example, the case of an incumbent ISP that does not price discriminate and that suddenly faces competition from an entrant or entrants that engage in price discrimination. The entrants will have incentives to use price discrimination

37. Rysman, *supra*, at 131.

38. Recently New York University’s Institute for Policy Integrity published a study that argued in favor of Net Neutrality regulation because of the “positive externality” associated with the Internet’s “Network Structure.” See Inimai M. Chettiar & J. Scott Holladay, *Free to Invest: The Economic Benefits of Preserving Net Neutrality*, New York University Institute for Policy Integrity, Report No. 4 (2010), at 9-10. The authors of this study fail to account for the fact that in two-sided markets with network externalities, price discrimination actually would serve to mitigate the market failure that creates this positive network externality.

39. Varian, *supra*, at 870.

40. Baumol, *supra*, at 2.

41. *Id.* at 5.

as a device to increase output so that they can reach as many subscribers as possible. As the entrants grow they will also reduce the incumbent's market share, pushing it up its average cost curve until it is earning a negative return. Once this occurs the incumbent will be forced to join entrants in employing discriminatory pricing or risk being driven from the market. In this context, allowing both incumbent ISPs and new entrants to engage in price discrimination is likely to increase welfare because additional consumers are served as a result of price discrimination.

The fact that, in the telecommunications industry, price discrimination is actually driven by competition is evident in the fact that cable companies have used bundling arrangements as a strategic device to facilitate entry into the markets for providing broadband and telephone service and incumbents have responded in kind. It has long been recognized by economists that bundling is a strategy that firms use to facilitate price discrimination.⁴²

From the perspective of dynamic efficiency, the case for allowing price discrimination is even stronger. There are two well-established, competing economic frameworks that assess how society can achieve the optimal level of innovation. The first approach, often associated with the eminent economist Professor Joseph Schumpeter, suggests that firms with market power will have the greatest incentive to innovate because of their large relative size and dominant position in a market.⁴³ The second approach, generally associated with Nobel Laureate Kenneth Arrow, suggests that firms engaged in competition will have the greater incentives to innovate because the increased business generated by an innovation will come mostly from sales that formerly would have gone to competitors, while monopolists may largely cannibalize their own

42. David S. Evans & Michael Salinger, *Why Do Firms Bundle and Tie? Evidence from Competitive Markets and Implications for Tying Law*, 22 YALE J. ON REG. 37 (2005).

43. See e.g., Randy A. Nelson, *Productivity Growth, Scale Economies, and the Schumpeterian Hypothesis*, 57 SOUTHERN ECON. J. 521, 521 (1990). The hypothesis that firms with market power are more innovative than competitive firms is economically distinct from Professor Schumpeter's famous theory that economic growth is fueled by the process of creative destruction.

business.⁴⁴ Although this debate has yet to be resolved, in both frameworks, innovation is driven by the desire to appropriate the surplus associated with innovation. Because price discrimination increases this surplus there is a strong dynamic efficiency rationale for permitting and even encouraging price discrimination in technologically evolving industries.⁴⁵

5.3 Vertical Integration

If the Commission's concerns about the social welfare consequences of discrimination are justified in any context, it is with regard to the issue of discrimination by an ISP that has vertically integrated into the provision of Internet content. There is a well established economic literature which demonstrates that vertical integration may reduce both consumer and total welfare when it either raises rivals' marginal costs of operation or deprives rivals of economies of scale necessary to reach minimum efficient scale, potentially reducing both static and dynamic efficiency.⁴⁶ Hence, it is theoretically possible that an ISP that is vertically integrated into the provision of Internet content could use its position to undermine the viability of rival content providers in order to increase its monopoly power in the content market. On the other hand, there is substantial evidence that vertical integration often increases efficiency, enhancing social welfare.

Given the theoretical potential for vertical integration to either increase or decrease economic welfare, *ex ante* regulation of vertical integration generally will be subject to error. It is useful to adopt the statistical concepts of Type I and Type II error as heuristics for establishing an optimal regulatory policy in the face of this potential for error. In this context, Type I error represents situations where the Commission undertakes a regulatory intervention and the

44. Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in *THE RATE AND DIRECTION OF ECONOMIC ACTIVITIES: ECONOMIC AND SOCIAL FACTORS* 609 (Richard Nelson, ed. 1962).

45. See e.g., Jerry A. Hausman & Jeffrey K. Mackie-Mason, *Price Discrimination and Patent Policy*, 19 RAND J. ECON. 253, 254 (1988).

46. See e.g., Steven C. Salop & David T. Scheffman, *Raising Rivals' Costs*, 73 AMER. ECON. REV. 267 (1983).

intervention actually reduces social welfare. Type II error represents situations where the Commission does not undertake a regulatory intervention when the intervention would have increased social welfare. The optimal regulatory framework balances these risks in a manner that minimizes the social cost of error.

There are two strong reasons to believe that, at this point in time, specific regulation of vertical integration by ISPs into the Internet content space will be subject to substantial Type I error. First, monopoly power in one market is a necessary condition for anticompetitive effects in almost all models of anticompetitive vertical integration. As discussed above, competition is becoming increasingly intense in the ISP market and there is scant evidence that, as a general matter, broadband providers possess true monopoly power. Second, ISPs generally serve regional markets whereas content markets are often national or international. Because a firm must be able to block entry to achieve monopoly power, the fact that entry into content markets occurs on both a national and international scale suggests that regional ISPs will not be able to create the entry barriers necessary to achieve dominance in content markets.

On the other hand, at this point in time, there is little risk of Type II error. We are not currently aware of any ISPs that have vertically integrated into and exercised monopoly power in any content market. Indeed, ISPs have yet to make significant inroads into content markets. Furthermore, the risk of Type II error is mitigated by the fact that anticompetitive vertical integration is already potentially actionable under the antitrust laws – an *ex post* regulatory response. Hence, we believe that the best course of action at this time is for the Commission to wait and see how the content market evolves before promulgating any additional

nondiscrimination rules that would potentially restrict pro-competitive vertical integration or otherwise materially alter how this dynamic market evolves.⁴⁷

5.4 Blanket Zero Price Regulation

Although the Commission did not suggest a blanket “zero price” regulation for content providers in the NPRM, some Net Neutrality advocates have proposed such a rule because they believe that ISPs would otherwise leverage their monopoly power to set too high a price for basic Internet access on the content side of the market.⁴⁸ The nondiscrimination rule articulated by the Commission, however, would prohibit ISPs from offering enhanced service at an increased price, which amounts to a zero price regulation for superior QOS offerings by ISPs. Furthermore, a zero price necessarily precludes positive price discrimination in any form. Because it would proscribe both differential pricing and price discrimination, a blanket zero price regulation would reduce economic welfare in the same way the proposed nondiscrimination rule would. Furthermore, prohibiting ISPs from charging content providers for any level of service would engender additional economic harm beyond that associated with the proposed nondiscrimination rule. As is the case with one-sided markets, possession of monopoly power in a two-sided market allows a firm to charge prices above marginal cost. However, as Professors Rochet and Tirole observe, there is no particular price structure bias under monopoly provisioning in two-sided markets. In fact, in the case of linear demands, the monopoly pricing structure and the Ramsey (welfare-maximizing) pricing structure are the same.⁴⁹ Another way of stating this result is that

47. See, e.g., Dennis L. Weisman & Glen O. Robinson, *Lessons for Modern Regulators from Hippocrates, Schumpeter and Kahn*, in NEW DIRECTIONS IN COMMUNICATIONS POLICY 3-37 (Randolph J. May ed., Carolina Academic Press 2009).

48. See e.g. Nicholas Economides & Joachim Tag, *Net Neutrality on the Internet: A Two-Sided Market Analysis*, NET Institute Working Paper No. 07-45 (2009).

49. Jean-Charles Rochet & Jean Tirole, *Platform Competition in Two-Sided Markets*, 1 J. EURO. ECON. ASSOC. 990, 990-1029 (2003).

“price structures are less likely to be distorted by market power than price levels.”⁵⁰ This result is important for evaluating regulatory intervention in two-sided markets. Hence, even if we assume solely for the purpose of argument that there is a dearth of competition in broadband markets, there is no basis for presuming that regulatory intervention to alter the price structure in such markets would prove to be welfare-enhancing.⁵¹ Put differently, regulatory intervention that alters the relative prices paid by the upstream and downstream sides of the market cannot be justified on grounds that it enhances economic welfare. It follows that regulatory intervention under these circumstances would violate what is arguably the overarching principle of sound public policy – “first, do no harm.”⁵²

5. Conclusion

In this paper, we have made three primary contributions to the Net Neutrality debate. First, we have articulated a clear economic distinction between pricing strategies that involve differential pricing and pricing strategies that involve price discrimination. Second, we have shown that the nondiscrimination rule proposed by the Commission in the NPRM actually contains three distinct regulations of economic activity under the monolithic banner of “discrimination.” Finally, we have evaluated both the Commission’s proposed nondiscrimination rule and “zero-price” regulation in the context of the economics of price discrimination and the economics of two-sided markets.

The Commission’s proposed nondiscrimination rule would seem to preclude three forms of economically distinct economic arrangements between ISPs and content providers—each of which is generally associated with increased consumer welfare. First it would prohibit Internet

50. Rochet & Tirole 2006, *supra*, at 646.

51. In the words of Professor Weyl, “The price balance chosen by the monopolist may well be optimal and when it is not it may be difficult to determine which direction it would be beneficial for it to move.” Weyl, *supra*, at 6.

52. Weisman & Robinson. *supra*.

service providers (“ISPs”) from charging different prices to content providers for the provision of different levels of service (“differential pricing”). Second, it would prohibit ISPs from charging different prices (economic “price discrimination”). Third, it would prevent ISPs that vertically integrate into the provision of Internet content from offering superior service to affiliated content providers. In its current form, this nondiscrimination rule would actually reduce society’s total economic welfare because the weight of the economic evidence suggests that both differential pricing and price discrimination by broadband providers toward content providers increases both static and dynamic efficiency. Furthermore, although there is a potential theoretical basis for concern about the welfare consequences of vertical integration there is no empirical evidence that vertical integration by ISPs into the content space has harmed or will reduce social economic welfare. In light of the fact that vertical integration is often welfare-enhancing and the antitrust laws already provide recourse for anticompetitive vertical integration, the Commission should not impose a blanket prohibition on vertical integration by ISPs into the content space at this time. Indeed, given the likelihood of socially detrimental error in regulating vertical integration and the low-likelihood of anticompetitive vertical integration by ISPs into Internet content markets, we believe the Commission should wait for the broadband market to evolve before promulgating any specific regulations limiting the ability of ISPs to vertically integrate into content.

Finally, some proponents of Net Neutrality regulation have proposed a blanket “zero-price” regulation under which ISPs would be precluded from charging content providers for even basic Internet access. Because a blanket zero-price regulation would also preclude differential pricing and price discrimination, such a policy would be expected to reduce economic welfare. Furthermore, the economics of two-sided markets are such that prohibiting ISPs from calibrating

an optimal price structure by charging both sides of the market is likely to perpetuate additional economic harm without any countervailing benefit.